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THE TUNG OIL (Chinese Wood-Oil) TREE,

A POSSIBLE TREE CROP FOR THE SOUTHERN UNITED STATES.

The tung oil tree (*Aleurites fordii*) of central China yields fruits from the seeds of which is extracted one of the most valuable drying oils known to commerce. It is a broad-leaved, deciduous tree, somewhat resembling the catalpa in appearance. It is rapid-growing, attains a height of 25 to 35 feet, and is said to be comparatively short-lived. Clusters of pinkish white flowers are produced just as the leaves begin to come out in spring (Pl. 1). These are followed by green fruits about the size of the fruit of the black walnut (Pl. 2), which often become partly colored with reddish brown. These fruits contain the large nut-like oily seeds from which the tung oil is expressed. The oil constitutes about 24 per cent (by weight) of the seeds or about 40 per cent of the kernels from which the shells have been removed.

The kernels of the tung seeds are violently purgative and otherwise poisonous, even in small quantities, and should not be eaten nor fed to domestic animals.

Tung oil has come into high esteem by reason of its waterproofing properties and the quick-, hard-drying and elastic qualities which it imparts to varnishes and paints. According to a prominent manufacturer, this oil combines, to a certain extent, the qualities of an oil and a gum, and by using it with the common southern rosin varnishes are produced which are which are superior to those made with the high-priced and rapidly disappearing copal gums, such as kauri, Manila, Zanzibar, etc.

The imports of tung oil into the United States, have amounted to as much as 5,000,000 gallons (about 39,100,000 pounds) in one year, representing a value, at average prices, of from \$2,500,000 to \$3,250,000. The price of the oil has fluctuated with the price of silver, and with ocean freight rates. The price under the present disturbed conditions is about 10 cents a pound, while normally it would be somewhat lower.

In China, according to the reports so far received, tung oil trees are not cultivated in orchard form but grow spontaneously, or are planted, on waste hillside lands. The Chinese farmers in the Yangtse valley above Hankow gather

the fruits, grind the seeds and press out the oil with primitive presses.

In America, tung tree cultivation appears to be capable of development as a crop of secondary importance, on cheap, well-drained, sandy clay soils, where there is an annual rainfall of 25 inches or more and where the temperature does not often go lower than 10° F. At the Agricultural Experiment Station, Clemson College, South Carolina, a single 8-year-old tree has withstood a temperature of 4° F. though it has not thrived as well as trees at places where the minimum is several degrees higher. However, young trees with the sap still flowing may be severely injured or even killed to the ground by a sudden fall in temperature to 18° or 20° F.

The principal tung oil plantations in the United States at present are in the neighborhood of Tallahassee, Florida; Experiment and Thomasville, Georgia, and Auburn and Robertsdale, Alabama. There are numerous smaller plantations and isolated trees in other sections of the south and in California. The first to be set out in orchard form were those at the Agricultural Experiment Stations at Auburn, Ala., and Experiment, Ga., in 1909. The latter is the larger and consists of one acre. The largest established grove in the United States is one of four acres, set out in 1913, on the Live-Oak Plantation, Tallahassee, Florida. On this and other plantations near Tallahassee, there are younger tung oil plantings aggregating about 140 acres.

The tung tree has been propagated almost entirely by seed, the seed being planted in the late autumn or early winter. The tree can be budded or grafted, however, and cuttings have been rooted. On account of variation in the fruiting habits of seedling trees, one of the asexual methods of propagation will doubtless prove useful in perpetuating desirable strains. The tree usually sprouts readily from the stump or roots when cut down or when killed back by frost.

A deep sand-clay loam is well adapted for tung tree culture, but from the present knowledge of the tree in this country, it is believed that, if even a small profit is to be hoped for, a commercial planting should be made on land on which the better known agricultural crops cannot be profitably grown. The trees should be spaced about 30 feet apart in all directions, which is accomplished by planting in staggered

Plate I.



Tung Oil Tree in Full Bloom.

This tree, on the farm of the late Mr. William H. Raynes, near Tallahassee, Florida, was imported as a seed from Hankow, China, in 1905. It bore an average of 305 fruits, or about 20 pounds of cleaned seed, each year from 1911 to 1915. It has not been injured by a temperature of 14° F.

Plate II.



Tung Oil Fruits and Leaves.

These fruits are from a tree at the country home of Mr. Aristide Hopkins, Biloxi, Miss. They contain normally from 3 to 5 seeds, about half the weight of the fruits, and the seeds are nearly one-quarter by weight composed of tung oil.

rows that are 30 feet apart one way and 26 feet the other. This gives about 52 trees to the acre. It is well to put a little fertilizer in the holes when setting out the trees. The ground must be kept free of weeds for a space of 3 or 4 feet around each tree for at least 3 years after planting. The trees should be headed at about 3 feet from the ground.

The fruits mature and fall, or may be picked, from the latter part of September to the end of October. The seeds are removed more easily by letting the fruits lie in a heap until the hulls split open or decay.

Tung oil seeds have not been produced in commercial quantities in this country as yet, and commercial methods of expressing the oil have not been developed. However, experts on drying oils report that tests made with such small quantities of American produced tung oil as are available, indicate that the quality is fully equal to that of the imported.

While the possible profits are apparently very small as compared with those in many other industries, it seems practically certain that there will be a steady market for all the oil that can be produced after the production reaches commercial proportions.

The Department of Agriculture will supply a limited number of 1-year-old trees to those experimenters in the South who may desire them, with the clear understanding that the production of tung oil in the United States is still in the experimental stage.

